Is the topic of malnutrition in older adults addressed in the European nursing curricula? A MaNuEL study

Eglseer, Doris; Halfens, Ruud J.G.; Schüssler, Sandra; Visser, Marjolein; Volkert, Dorothee; Lohrmann, Christa

published in
Nurse Education Today
2018

DOI (link to publisher)
10.1016/j.nedt.2018.05.015

document version
Publisher's PDF, also known as Version of record

Nurse Education Today 68 (2018) 13–18

Contents lists available at ScienceDirect

Nurse Education Today

journal homepage: www.elsevier.com/locate/nedt

Is the topic of malnutrition in older adults addressed in the European nursing curricula? A MaNuEL study

Doris Eglseer[a,*], Ruud J.G. Halfens[b], Sandra Schüssler[a], Marjolein Visser[c], Dorothee Volkert[d], Christa Lohrmann[a]

[a] Medical University of Graz, Institute of Nursing Science, Universitätsplatz 4, 8010 Graz, Austria
[b] Maastricht University, Department of Health Services Research, Care and Public Health Research Institute, Duboisdomein 30, 6229 GT Maastricht, The Netherlands
[c] VU Medical Center, Department of Internal Medicine & Vrije Universiteit Amsterdam, Department of Health Sciences, Amsterdam, The Netherlands
[d] Friedrich-Alexander-Universität Erlangen-Nürnberg, Institute for Biomedicine of Aging, Kobergerstraße 60, 90408 Nürnberg, Germany

ARTICLE INFO

Keywords:
Nursing education
Nursing education research
Nutrition
Malnutrition
Older adults

ABSTRACT

Background: The lack of sufficient knowledge of health care professionals is one main barrier to implementing adequate nutritional interventions. Until now, it is not known to which extent European nurses are exposed to the topic of malnutrition in older adults during their education.
Objective: To determine whether formal nursing degree programs in Europe address the topic of nutrition and, specifically, malnutrition in older adults.
Design: A cross-sectional study was conducted using an online-survey.
Participants: The online-survey link was e-mailed to 926 nursing education institutions in 31 European countries.
Methods: This study was conducted as part of the *Healthy Diet for Healthy Life Joint Programming Initiative, Malnutrition in the Elderly Knowledge Hub* (MaNuEL) project. Descriptive analyses were performed using SPSS. Associations were calculated using the chi-square tests and Fisher's exact test.
Results: The response rate of our survey was 14.2% (131 institutions). Of these, 113 (86.3%) addressed the topic of nutrition in their educational programs, and 73.7% addressed the topic of malnutrition in older adults. Malnutrition screening (70.8%), causes (67.2%) and consequences (68.7%) of malnutrition were frequently-addressed topics of content. Topics that were rarely addressed included nutritional support in intensive care units (ICU) (23.7%), cooperation in multidisciplinary nutrition teams (28.2%), dietary counselling (32.1%) and the responsibilities of various professions in nutritional support (35.1%). The topic of malnutrition in older adults is taught by nurses in 52.7%, by dietitians in 23.7%, by nutritional scientists in 18.3%, and physicians in 19.8% of the institutions.
Conclusions: The topics of malnutrition and malnutrition screening are currently not included in the content of nutrition courses taught at nearly 30% of the European educational institutions for nurses. Nursing educators urgently need to improve curriculum content with respect to the topic of malnutrition in older adults to enable nurses to provide high-quality nutritional care of older persons.

1. Introduction

The prevalence of malnutrition ranges from 20 to 50% in hospitalized patients and can reach up to 70% in nursing home residents (Bell et al., 2013; Pirlich et al., 2006; Roller et al., 2016). The literature describes numerous negative consequences of malnutrition, including negative health-related outcomes, such as poor wound-healing, infections, complications and hospital readmissions (Felder et al., 2015; Norman et al., 2008). In addition, malnutrition places a considerable cost burden on the health care systems (Freijer et al., 2013; Khalatbari-Soltani, 2015).

Nevertheless, malnutrition is often poorly recognized and undertreated (Correia et al., 2014). There are many explanations as to why nutritional interventions are not implemented and conducted. The Council of Europe identified the lack of sufficient education with regard to nutrition among all staff groups as one major barrier (Europe, 2002). In a recently published study, nurses were interviewed and asked their opinions about barriers that prevented them from providing good

* Corresponding author.
E-mail addresses: doris.eglseer@medunigraz.at (D. Eglseer), r.halfens@maastrichtuniversity.nl (R.J.G. Halfens), sandra.schuessler@medunigraz.at (S. Schüssler), m.visser@vu.nl (M. Visser), dorothee.volkert@fau.de (D. Volkert), christa.lohrmann@medunigraz.at (C. Lohrmann).

https://doi.org/10.1016/j.nedt.2018.05.015
Received 23 October 2017; Received in revised form 13 April 2018; Accepted 18 May 2018

nutritional care (Eide et al., 2015). The authors of this study found that the lack of sufficient knowledge and skills was the main reason given that adequate interventions were not implemented. In other studies, negative attitudes towards nutrition were reported to play an important role (Bauer et al., 2015). Nurses are often not familiar with the current guidelines and are unsure which methods they should use to conduct nutritional screening of clients (Eide et al., 2015). On the other hand, the results of other studies have shown that nurses working in clinical practice want to receive education on malnutrition, but often do not have access to appropriate educational programs (Duerksen et al., 2016).

For nurses to be able to provide optimal nutritional care for older adults, they must be educated about malnutrition while receiving their basic formal education and training (DiMaria-Ghalili et al., 2014). Based on international guidelines on the management of malnutrition, the inclusion of the following content in the nursing curricula is crucial: malnutrition screening, nutritional interventions that can be supported by nurses (e.g., provision of oral nutritional supplements or energy-protein enriched food), monitoring of nutritional intake and multidisciplinary cooperation.

In a comprehensive literature review of publications indexed in the medical databases MEDLINE (PubMed), CINAHL and EMBASE, which was conducted by the authors in September and October 2016, not a single study was found that dealt with malnutrition in the context of the education of European nurses. One survey carried out in the U.S. in nursing schools was identified (Stotts et al., 1987), but this survey was conducted > 30 years ago and only surveyed the level of general nutrition education rather than education on malnutrition in older adults.

At present, the extent to which European nurses are exposed to the topic of malnutrition in older adults during their basic education has not been researched. Therefore, the aim of this study was to determine the provisions and content of nutrition education and, particularly, education about malnutrition in older adults in formal nursing educational programs throughout Europe.

2. Methods

2.1. Design

This study was conducted as part of the *Healthy Diet for Healthy Life Joint Programming Initiative*, *Malnutrition in the Elderly Knowledge Hub* (MaNuEL) project, which aims to build research capacity on malnutrition in older persons in Europe (Visser et al., 2017). We selected a cross-sectional study design and used a web-based online survey to gather extensive information about curricula content on nutrition, and especially malnutrition in basic educational programs for nurses.

2.2. Questionnaire

An online questionnaire was developed based on a questionnaire used by Adams et al. in a prior study, which was conducted to gather information about nutrition education from medical schools in Europe (Adams et al., 2006). Questions were added to collect more detailed information, such as about the content development for the respective nutrition courses. Furthermore, questions about malnutrition in older adults were added. Once the questionnaire had been developed, it was e-mailed to members of the MaNuEL project team who are experts in the field of malnutrition in six European countries (Austria, Germany, Netherlands, Spain, France and Ireland), and feedback was requested. The questionnaire was subjected to minor revision based on the feedback and propositions, such as new answer categories, were added to some questions.

The final, revised questionnaire contained 15 questions. All questions except the last one were close-ended with pre-formulated answers. All institutions were asked to send the curriculum of the nutrition courses to the authors. The questionnaire was prepared in the English language and is shown in a Supplemental file.

2.3. Sampling

All European countries that are members of the European Union (n = 28) were included in this study. In addition, the countries of Switzerland, Norway and Iceland were included because they were perceived as countries comparable to EU members states. A list of nursing universities, universities of applied sciences and nursing schools in all the countries (n = 31) was generated.

National nursing associations in each of the countries were contacted and asked to provide a list of all educational institutions for nurses, including the e-mail addresses of contact persons. These were provided by 11 countries. If countries did not send a complete list, a supplementary internet search was conducted to identify nursing universities, universities of applied sciences and nursing schools in the respective countries.

The institutions were invited to participate in the study via e-mail and received an informative letter about the study; participation in the study was thereby voluntary. The online survey was anonymous and was carried out using a secure website. The software tool “Survey Monkey” was used to create the online-survey. In January 2017, the online-survey link was emailed to 926 nursing education institutions in 31 European countries.

2.4. Interventions to increase response

To increase the response rate of the survey, the following interventions were implemented (Edwards et al., 2009; Fan and Yan, 2010):

- A non-monetary incentive was offered (study results provided after completion of the study)
- The questionnaire was kept as short as possible (requiring about 10 min to complete)
- Personalized cover letters were sent via e-mail (mainly to the person responsible for education and curriculum development or the head of the institution, if it was possible to identify contact persons)
- A special Medical University e-mail address was created and used to send out the e-mails
- Two reminders were sent (after two weeks and after five weeks)
- The survey delivery was accomplished with the help of local nursing associations (cover letters were written in the target language of each country)

2.5. Data analysis

The statistical software SPSS version 23 (IBM Statistics, 2015) was used for purposes of data analysis, and the questionnaire answers were analysed using descriptive statistics. Questionnaires with missing data were excluded from the analysis (n = 60). The reason for this was that, in most incomplete questionnaires, only the first few questions were answered, and the questions about malnutrition in older adults were not answered. Associations between the types of institution and the contents of malnutrition education were calculated using the chi-square tests and Fisher's exact test.

3. Results

A total of 191 (20.6%) out of 926 institutions filled out the online questionnaire. Of those 191 questionnaires, 131 (68.6%) were completely filled out and included in the data analysis. The response rate of universities was 10.1% (n = 44), the response rate of universities of applied sciences was 75.5% (n = 37) and the response rate of nursing schools was 11.2% (n = 49). One institution listed its institution type as “other”. No responses at all were received from institutions located in France, Greece, Iceland, Latvia, or Sweden. Table 1 shows the number

Table 1
Number of completed questionnaires and response rate by country and type of nursing institution.

	Questionnaires sent out n = 926	Completed questionnaires n = 131				Total response %
		Completed University n = 44	Completed University of Applied Sciences n = 37	Completed School of Nursing n = 49	Completed Other n = 1	
Austria	64	1	3	6	0	15.6
Belgium	26	0	1	4	0	19.2
Bulgaria	11	6	0	1	0	63.6
Croatia	6	2	0	2	0	66.7
Cyprus	5	3	0	0	0	60.0
Czech Republic	16	5	1	0	0	37.5
Denmark	25	0	0	2	0	8.0
Estonia	3	1	2	0	0	100.0
Finland	24	0	7	0	0	29.2
Germany	171	0	1	17	0	10.5
Hungary	6	1	2	0	0	50.0
Ireland	14	7	0	2	0	64.3
Italy	34	2	0	0	0	5.9
Lithuania	9	1	4	1	0	66.7
Luxemburg	1	0	0	1	0	100.0
Malta	1	1	0	0	0	100.0
Netherlands	40	0	1	1	0	5.0
Norway	12	1	1	0	0	16.7
Poland	37	1	1	0	0	5.4
Portugal	41	3	3	7	0	31.7
Romania	9	1	0	1	0	22.2
Slovakia	19	1	1	0	0	10.5
Slovenia	19	1	2	1	0	21.1
Spain	58	6	1	2	0	15.5
Switzerland	19	0	5	1	0	31.6
United Kingdom	45	0	1	0	1	4.4

of completed questionnaires and response rate by country and institution type.

The respondents included persons responsible for curriculum development (45%), members of the faculty of education (44%), lecturers in the field of nutrition/malnutrition (18.3%), lecturers in the field of malnutrition in older adults (17.6%) and experts (e.g., researchers) in the field of malnutrition (4.6%). Some of the respondents answered the question with “others” and were mostly teachers in other subjects than malnutrition or dean/heads of the institutions.

3.1. Nutrition education in general

A total of 113 (86.3%) of the institutions stated that they offered nutrition education. In 96 (73.3%) of all institutions, nutrition education is a mandatory part of the nursing curricula, and in 17 (13%), it is only optional. A high percentage of the institutions offering nutrition education do so during the first year (74.0%) or during the second year (63.4%) (see Table 2). Few of the responding institutions teach nutrition during only one year of education (17.6%). Most of them include it in more than one year of education; 23.7% teach it during two years, 23.7% during three years, 23.7% during four years, and 9.2% during five years of the respective education program. The amount of time allocated to nutrition education was mostly < 5 h per year, but 26 institutions (19.8%) provided > 25 h of education during the first year of nutrition education (see Table 2).

Table 2
Extent of nutrition education per year of education of the respective institutions (in % of all institutions) (n = 131).

	0 h	< 5 h	6–15 h	16–25 h	> 25 h
1st year	26.0	24.4	19.1	10.7	19.8
2nd year	36.6	30.5	17.6	6.1	9.2
3rd year	42.0	31.3	16.8	4.6	5.3
4th year	61.1	21.4	14.5	1.5	1.5
5th year	74.0	13.0	7.6	1.5	3.8

The survey results indicated that teachers/educators (81, 61.8%), responsible persons from the nursing faculty (84, 61.1%), or interdisciplinary faculties (22, 16.8%), students (36, 27.5%), experts, for instance on nutrition (33, 25.2%), external experts (25, 19.1%) and administrators (12, 9.2%) developed the curricula of the nutrition courses (multiple answers were possible).

The contents of the nutrition and malnutrition courses were developed, for the most part, based on nutritional guidelines (62.6%), the expertise of specialists (46.6%) and recommendations from professional nutrition associations (35.9%) (multiple answers were possible). If the contents of the courses were developed based on guidelines or professional nutritional associations, the institutions used local or national, country-specific recommendations (n = 31). Nine respondents indicated that they use European recommendations, such as the guideline of the *European Society for Clinical Nutrition and Metabolism* (ESPEN), and very few (n = 5) used recommendations from other non-European countries (e.g., USA) or the *World Health Organization* (WHO).

3.2. Nutrition education with respect to malnutrition in older adults

The topic of malnutrition education in older adults was included as part of the nurses' curricula in 73.3% (n = 96) of the institutions surveyed. Regarding the content of the malnutrition education, the most commonly mentioned topic was malnutrition screening (68, 70.8%). If the institutions indicated that malnutrition screening was taught as part of the educational program, they were asked to state which screening tools they recommend in their courses. The most frequently ticked screening tool was the *Mini Nutritional Assessment* (MNA), followed by the *Malnutrition Universal Screening Tool* (MUST) and the *Nutritional Risk Screening* (NRS). The topics of the causes (88, 67.2%) and consequences (90, 68.7%) of malnutrition were also frequently covered in the lectures. Content that was rarely reported included nutrition support in intensive care units (ICU) (31, 23.7%), cooperation in multidisciplinary nutrition support teams (37, 28.2%), dietary counselling (42, 32.1%)

Table 3
Content of the education with respect to malnutrition in older adults in the total sample and by type of institution, sorted by frequency of response.

Topic	Total (%) n = 131	University (%) n = 44	University of Applied Sciences (%) n = 37	School of Nursing (%) n = 49	p-Value for differences between type of nursing institutions
Malnutrition screening	70.8	65.5	71.0	74.3	0.71
Consequences of malnutrition	68.7	61.4	78.4	67.3	0.36
Causes of malnutrition	67.2	63.6	75.7	63.3	0.57
Indications for parenteral nutrition	67.0	52.3	56.8	46.9	0.65
Assessment	59.5	50.0	67.6	61.2	0.30
Indications for enteral nutrition	57.3	59.1	64.9	51.0	0.40
Oral nutritional supplements	53.4	56.8	59.5	44.9	0.37
Application of enteral nutrition	53.4	50.0	64.9	49.0	0.28
Application of parenteral nutrition	51.1	47.7	59.5	49.0	0.52
Monitoring/evaluation	46.6	47.7	51.4	40.8	0.55
Calculation of nutritional requirements	43.6	43.2	54.1	36.7	0.33
Methods for food fortification	38.9	31.8	54.1	32.7	0.07
Perioperative nutrition	36.6	36.4	45.9	30.6	0.46
Responsibilities of various professions	35.1	31.8	40.5	32.7	0.45
Dietary counselling	32.1	31.8	43.2	24.5	0.26
Multidisciplinary nutrition support teams	28.2	25.0	35.1	24.5	0.29
Nutrition support in ICU	23.7	27.3	35.1	12.2	0.06
Other	6.9	4.5	8.1	8.2	0.77

and the responsibilities of various professionals in nutritional support (46, 35.1%). No significant differences were detected between the institution types. However, teachers at universities of applied sciences tended to present more lectures about methods for food fortification, and teachers at schools of nursing tended to present lectures on nutrition support in the ICU less frequently than teachers in other institutions (see Table 3).

In 52.7% (n = 69) of the institutions, the survey results indicated that the topic of malnutrition in older adults is taught by nurses. Dietitians hold lectures on this topic in 23.7% (n = 31), nutritional scientists in 18.3% (n = 24), and physicians, in 19.9% (n = 26) of the institutions. 6.1% (n = 8) of the respondents stated that other experts, such as pharmacologists or nurses with special education on nutrition, hold the lectures on malnutrition (multiple answers were possible). An internal board of experts provided quality insurance for the respective curriculum in 58.8% (n = 77). Most of the respondents stated that they perceived malnutrition as either a very important (88, 67.2%) or important (27, 20.6%) topic in nursing education.

It was not possible to conduct a content analysis of the curricula of the nutrition courses because the study team did not receive any curricula from the education institutions.

4. Discussion

To our best knowledge, this study is the first to evaluate the provision and content of nutrition education in the formal education of nurses in European countries. The results of this study provide insights into how the topic of nutrition, and specifically malnutrition in older adults, is currently addressed in formal nursing education programs. Our results show that 13.7% of the participating educational institutions do not include courses on nutrition in their curricula of the nurse education programs. 26.7% of the institutions do not address the topic of malnutrition in older adults and nearly 30% of the institutions do not address the topic of malnutrition screening as part of the curriculum. Some topics, such as multi-professional nutrition support and certain interventions (e.g., methods for food fortification), as well as their monitoring and evaluation, are only rarely included in the curricula.

4.1. Provision of education about nutrition and malnutrition

26.7% of nurses that graduate from educational institutions have no exposure to the topic of malnutrition in older people during their formal education and before beginning their professional career. The lack of knowledge and skills, in turn, represent major barriers to providing adequate nutritional care for malnourished people (Eide et al., 2015). These results are of particular concern, since older people are (already) the main population group in need of nursing care, and the demographic changes in Europe will lead to an increasing number of older people who are dependent on care (He and Kowal, 2016). Therefore, content on malnutrition needs to be included as part of the curriculum for nurses.

Lectures on malnutrition are mostly held by nurses. Based on our data, dietitians teach only 23.7% of the nutrition courses. Because they have expertise in nutrition education, dietitians play an important role in teaching and provide crucial training for other health care professionals (Kris-Etherton et al., 2014). Teachers with expertise and specialized knowledge, such as dietitians, should preferably be involved in the education of other health professionals, if possible. The efforts of other health professionals, such as nurses and physicians, to provide additional contributions should be supported to strengthen networks of multidisciplinary cooperation and enable nurses to gain different perspectives during their educational period. In a best-case scenario, the formal education is connected to placements, and the knowledge is directly applied in practice. However, as far as we know, no general recommendations currently exist on how much nutrition education should be included in the basic formal education of nurses in Europe.

4.2. Malnutrition screening

Since nurses are in close contact with the clients, they are in a very good position to recognize problems with eating and drinking and, consequently, the (risk of) malnutrition early on (Bjerrum et al., 2012). Identifying malnourished clients by conducting malnutrition screening via validated screening tools is one of the nurses' main responsibilities and represents part of the multi-professional approach to provide good nutritional care (Tappenden et al., 2013). The results of the current study, however, show that malnutrition screening is not addressed in nutrition courses offered at about 30% of the institutions that provide formal nursing education.

The results of recent studies have shown that the nutritional status of hospitalized patients and nursing home residents are, in some European countries, rarely screened using validated screening tools (Eglseer et al., 2017), even though this has been recommended by experts and international, evidence-based practice guidelines (Kondrup

et al., 2003; Mueller et al., 2011). Screening rates differ significantly between European countries and, for example, are higher in Nordic European countries than in South Eastern or Southern European countries (Schindler et al., 2010). In countries with low screening rates, nurses often rely on unreliable parameters to evaluate their clients' nutritional status, such as clinical judgement or current weight (Abayomi and Hackett, 2004; Eglseer et al., 2017). These parameters are not suitable for the identification of malnourished persons; studies have found that nurses underestimate the prevalence of malnutrition when they use clinical judgement (Abayomi and Hackett, 2004; Suominen et al., 2009). Using the current weight as a parameter is also problematic, because malnutrition in older adults is not necessarily associated with low BMI. Weight and weight-related parameters such as BMI are often misleading and difficult to interpret (Camina-Martin et al., 2015). Furthermore, older persons frequently undergo therapies or have diseases that influence the fluid balance and, subsequently, make it difficult to interpret weight changes (Cederholm et al., 2017). Therefore, the nurses must receive good training that enables them to screen older persons properly for malnutrition and, namely, in an evidence-based manner.

4.3. Malnutrition interventions

The results of the current study indicate that several evidence-based interventions are not frequently taught during the nurses' basic educational period (see Table 3). Representatives from about half of the institutions stated that they include the topic of oral nutritional supplements in their curriculum. Other topics were less frequently included, such as methods of food fortification (38.9%), perioperative nutrition (36.6%), dietary counselling (32.1%), or nutrition support in intensive care units (ICU) (23.7%). Nutrition support for older patients in ICU may not necessarily need to be part of curriculum because it is an extremely specific topic. Dietary counselling also does not necessarily need to be part of the nurses' curricula. In most European countries, dietitians are accredited experts in nutrition and, therefore, are responsible for providing dietary counselling in (clinical) practice (EFAD, 2011; Watterson et al., 2009). However, while dietitians have the responsibility to develop nutritional care plans and conduct dietary counselling, the implementation of the interventions related to these care plans requires the involvement and, therefore, the knowledge of nurses (Jefferies et al., 2011). For that reason, information about interventions for malnourished older adults or older adults at risk of malnutrition and the specific role of nurses in those interventions must be included in the nutrition courses offered as part of the curriculum.

4.4. Multidisciplinary nutritional support

Our results show that only 28% of the participating institutions address multidisciplinary nutrition teams in their curricula, and only 35% address the responsibilities of different staff groups with respect to nutritional care. Already in 2002, the European Council of Europe had identified major barriers to the provision of adequate nutritional care in hospitals. Two of these were the lack of cooperation between staff groups and the lack of clearly assigned responsibilities in planning and managing nutritional care (Council of Europe, 2002). Since then, many studies have identified poor communication and the lack of cooperation between different professionals and in different settings as significant problems (Eide et al., 2015; Green and James, 2013). Health professionals from various disciplines seem to lack an understanding of their own and other professionals' roles in nutritional care (Green and James, 2013).

4.5. Limitations

Even though the authors made great efforts to strengthen the quality of this study, some limitations exist. It is known that the quality of findings from online surveys can be threatened by low response rates (Fan and Yan, 2010). In the current study, an overall response rate of 14.2% could be achieved. Therefore, it is not possible to draw general conclusions about all European institutions based on these results. Furthermore, the persons who filled out the online survey may have not known specific details about the content of the nutrition education courses offered by the institutions, and this may have influenced their answers. In addition, it is not possible to rule out the possibility of a response bias. The fact that the survey was presented in the English language might have represented a barrier for participation. Although we carefully conducted an internet search and cooperated with national nursing associations to identify all nursing education institutions, it is also possible that we did not find all of them.

5. Conclusions

Our survey results revealed that the topic of malnutrition in older adults and malnutrition screening is not taught in nearly 30% of the participating institutions that offer basic nursing education.

In the future, the existing curricula should be analysed in detail. One priority of future studies should be to conduct an analysis of the effectiveness of educational interventions in nursing education and nursing practices regarding malnutrition in older adults. Because a lack of malnutrition education on some topics was identified, especially multidisciplinary nutrition support, different nutritional interventions and the evaluation of these interventions, existing courses on malnutrition should be adapted and/or new high-quality courses should be developed. In educational practice, the content on the topic of nutrition should be taught by nutrition professionals, such as dietitians in close cooperation with members of multi-professional teams to provide different perspectives on the problem (Kris-Etherton et al., 2014).

In conclusion, the results of this survey suggest that the way nutrition, and especially malnutrition, is taught as part of the nursing curricula in European institutions should be improved to enable nurses as part of the multidisciplinary team to provide high-quality nutritional care of older persons.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.nedt.2018.05.015.

Acknowledgements

We would like to express our thanks to Isabell Kravanja, BScN, who supported this study as a student assistant. The preparation of this paper was supported by the MAlNUtrition in the ELderly (MaNuEL) knowledge hub. This work is supported by the Joint Programming Initiative ‘Healthy Diet for a Healthy Life’. The funding agencies supporting this work are: Austria: Federal Ministry of Science, Research and Economy (BMWFW-10.420/0004-WF/V/3c/2016); France: Ecole Supérieure d'Agricultires (ESA); Germany: Federal Ministry of Food and Agriculture (BMEL) (2815ERA10E and 2815ERA08E) represented by Federal Office for Agriculture and Food (BLE); Ireland: Department of Agriculture, Food and the Marine (DAFM) (15/HDHL/2 MANUEL); and the Health Research Board (HRB); Spain: Instituto de Salud Carlos III, and the SENATOR trial (FP-HEALTH-2012-305930); The Netherlands: The Netherlands Organisation for Health Research and Development (ZonMw) (50-52905-98-499).

References

Abayomi, J., Hackett, A., 2004. Assessment of malnutrition in mental health clients: nurses' judgement vs. a nutrition risk tool. J. Adv. Nurs. 45, 430–437.
Adams, K.M., Lindell, K.C., Kohlmeier, M., Zeisel, S.H., 2006. Status of nutrition education in medical schools. Am. J. Clin. Nutr. 83, 941S–944S.
Bauer, S., Halfens, R.J., Lohrmann, C., 2015. Knowledge and attitudes of nursing staff towards malnutrition care in nursing homes: a multicentre cross-sectional study. J. Nutr. Health Aging 19, 734–740.
Bell, C.L., Tamura, B.K., Masaki, K.H., Amella, E.J., 2013. Prevalence and measures of

nutritional compromise among nursing home patients: weight loss, low body mass index, malnutrition, and feeding dependency, a systematic review of the literature. J. Am. Med. Dir. Assoc. 14, 94–100.
Bjerrum, M., Tewes, M., Pedersen, P., 2012. Nurses' self-reported knowledge about and attitude to nutrition – before and after a training programme. Scand. J. Caring Sci. 26, 81–89.
Camina-Martin, M.A., de Mateo-Silleras, B., Malafarina, V., Lopez-Mongil, R., Nino-Martin, V., Lopez-Trigo, J.A., Redondo-del-Rio, M.P., 2015. Nutritional status assessment in geriatrics: consensus declaration by the Spanish Society of Geriatrics and Gerontology Nutrition Work Group. Maturitas 81, 414–419.
Cederholm, T., Barazzoni, R., Austin, P., Ballmer, P., Biolo, G., Bischoff, S.C., Compher, C., Correia, I., Higashiguchi, T., Holst, M., Jensen, G.L., Malone, A., Muscaritoli, M., Nyulasi, I., Pirlich, M., Rothenberg, E., Schindler, K., Schneider, S.M., de van der Schueren, M.A., Sieber, C., Valentini, L., Yu, J.C., Van Gossum, A., Singer, P., 2017. ESPEN guidelines on definitions and terminology of clinical nutrition. Clinical Nutrition (Edinburgh, Scotland) 36, 49–64.
Correia, M.I., Hegazi, R.A., Higashiguchi, T., Michel, J.P., Reddy, B.R., Tappenden, K.A., Uyar, M., Muscaritoli, M., 2014. Evidence-based recommendations for addressing malnutrition in health care: an updated strategy from the feed M.E. Global Study Group. J. Am. Dir. Assoc. 15, 544–550.
DiMaria-Ghalili, R.A., Mirtallo, J.M., Tobin, B.W., Hark, L., Van Horn, L., Palmer, C.A., 2014. Challenges and opportunities for nutrition education and training in the health care professions: intraprofessional and interprofessional call to action. Am. J. Clin. Nutr. 99, 1184s–1193s.
Duerksen, D.R., Keller, H.H., Vesnaver, E., Laporte, M., Jeejeebhoy, K., Payette, H., Gramlich, L., Bernier, P., Allard, J.P., 2016. Nurses' perceptions regarding the prevalence, detection, and causes of malnutrition in Canadian hospitals: results of a Canadian malnutrition task force survey. JPEN J. Parenter. Enteral Nutr. 40, 100–106.
Edwards, P.J., Roberts, I., Clarke, M.J., Diguiseppi, C., Wentz, R., Kwan, I., Cooper, R., Felix, L.M., Pratap, S., 2009. Methods to increase response to postal and electronic questionnaires. Cochrane Database Syst. Rev. 8. http://dx.doi.org/10.1002/14651858.MR000008.
EFAD European Federation of the Associations of Dietitians, 2011. Position Paper on the Role of the Dietitian in the Prevention and Management of Malnutrition in Adults.
Eglseer, D., Halfens, R.J., Lohrmann, C., 2017. Is the presence of a validated malnutrition screening tool associated with better nutritional care in hospitalized patients? Nutrition (Burbank, Los Angeles County, Calif.) 37, 104–111.
Eide, H.D., Halvorsen, K., Almendingen, K., 2015. Barriers to nutritional care for the undernourished hospitalised elderly: perspectives of nurses. J. Clin. Nurs. 24, 696–706.
Fan, W., Yan, Z., 2010. Factors affecting response rates of the web survey: a systematic review. Comput. Hum. Behav. 26, 132–139.
Felder, S., Lechtenboehmer, C., Bally, M., Fehr, R., Deiss, M., Faessler, L., Kutz, A., Steiner, D., Rast, A.C., Laukemann, S., Kulkarni, P., Stanga, Z., Haubitz, S., Huber, A., Mueller, B., Schuetz, P., 2015. Association of nutritional risk and adverse medical outcomes across different medical inpatient populations. Nutrition (Burbank, Los Angeles County, Calif.) 31, 1385–1393.
Freijer, K., Tan, S.S., Koopmanschap, M.A., Meijers, J.M., Halfens, R.J., Nuijten, M.J., 2013. The economic costs of disease related malnutrition. Clinical Nutrition (Edinburgh, Scotland) 32, 136–141.
Green, S.M., James, E.P., 2013. Barriers and facilitators to undertaking nutritional screening of patients: a systematic review. Journal of Human Nutrition and Dietetics: The Official Journal of the British Dietetic Association 26, 211–221.
He, B.G.D., Kowal, P., 2016. International Population Reports - An Aging World: 2015, Washington, DC.
IBM Statistics, 2015. SPSS Software for Windows. IBM Corp., Armonk, NY.
Jefferies, D., Johnson, M., Ravens, J., 2011. Nurturing and nourishing: the nurses' role in nutritional care. J. Clin. Nurs. 20, 317–330.
Khalatban-Soltani, S.M.-V.P., 2015. The economic cost of hospital malnutrition in Europe; a narrative review. Clinical Nutrition ESPEN 10, e89–e94.
Kondrup, J., Allison, S.P., Elia, M., Vellas, B., Plauth, M., 2003. ESPEN guidelines for nutrition screening 2002. Clinical Nutrition (Edinburgh, Scotland) 22, 415–421.
Kris-Etherton, P.M., Akabas, S.R., Bales, C.W., Bistrian, B., Braun, L., Edwards, M.S., Laur, C., Lenders, C.M., Levy, M.D., Palmer, C.A., Pratt, C.A., Ray, S., Rock, C.L., Saltzman, E., Seidner, D.L., Van Horn, L., 2014. The need to advance nutrition education in the training of health care professionals and recommended research to evaluate implementation and effectiveness. Am. J. Clin. Nutr. 99, 1153s–1166s.
Mueller, C., Compher, C., Ellen, D.M., 2011. A.S.P.E.N. clinical guidelines: nutrition screening, assessment, and intervention in adults. JPEN J. Parenter. Enteral Nutr. 35, 16–24.
Norman, K., Pichard, C., Lochs, H., Pirlich, M., 2008. Prognostic impact of disease-related malnutrition. Clinical Nutrition (Edinburgh, Scotland) 27, 5–15.
Pirlich, M., Schutz, T., Norman, K., Gastell, S., Lubke, H.J., Bischoff, S.C., Bolder, U., Frieling, T., Guldenzoph, H., Hahn, K., Jauch, K.W., Schindler, K., Stein, J., Volkert, D., Weimann, A., Werner, H., Wolf, C., Zurcher, G., Bauer, P., Lochs, H., 2006. The German hospital malnutrition study. Clinical Nutrition (Edinburgh, Scotland) 25, 563–572.
Roller, R.E., Eglseer, D., Eisenberger, A., Wirnsberger, G.H., 2016. The Graz Malnutrition Screening (GMS): a new hospital screening tool for malnutrition. Br. J. Nutr. 115, 650–657.
Schindler, K., Pernicka, E., Laviano, A., Howard, P., Schutz, T., Bauer, P., Grecu, I., Jonkers, C., Kondrup, J., Ljungqvist, O., Mouhieddine, M., Pichard, C., Singer, P., Schneider, S., Schuh, C., Hiesmayr, M., 2010. How nutritional risk is assessed and managed in European hospitals: a survey of 21,007 patients findings from the 2007–2008 cross-sectional nutritionDay survey. Clinical Nutrition (Edinburgh, Scotland) 29, 552–559.
Stotts, N.A., Englert, D., Crocker, K.S., Bennum, N.W., Hoppe, M., 1987. Nutrition education in schools of nursing in the United States. Part 2: the status of nutrition education in schools of nursing. JPEN J. Parenter. Enteral Nutr. 11, 406–411.
Suominen, M.H., Sandelin, E., Soini, H., Pitkala, K.H., 2009. How well do nurses recognize malnutrition in elderly patients? Eur. J. Clin. Nutr. 63, 292–296.
Tappenden, K.A., Quatrara, B., Parkhurst, M.L., Malone, A.M., Fanjiang, G., Ziegler, T.R., 2013. Critical role of nutrition in improving quality of care: an interdisciplinary call to action to address adult hospital malnutrition. J. Acad. Nutr. Diet. 113, 1219–1237.
Visser, M., Volkert, D., Corish, C., Geisler, C., de Groot, L.C., Cruz-Jentoft, A.J., Lohrmann, C., O'Connor, E.M., Schindler, K., de van der Schueren, M.A., on behalf of the MaNu E.L.c., 2017. Tackling the increasing problem of malnutrition in older persons: the Malnutrition in the Elderly (MaNuEL) Knowledge Hub. Nutr. Bull. 42, 178–186.
Watterson, C., Fraser, A., Banks, M., et al., 2009. Evidence based practice guidelines for the nutritional management of malnutrition in adult patients across the continuum of care. Nutr. Diet. 66, S1–S34.